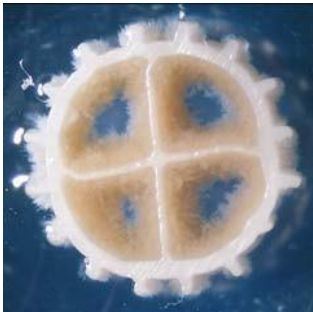
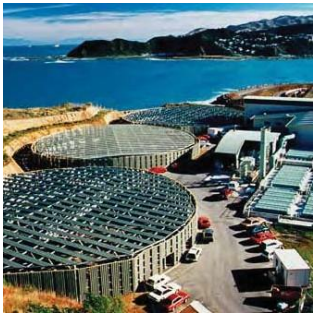




Leading-Edge Biological Treatment:

ECO MBBR™

Moving Bed Bio-film Reactor



A bio-film consists of micro-organisms and their extra-cellular products, attached to a solid surface.

ECO MBBR™ Bio-film Technology

An advanced biological treatment process for municipal and industrial wastewaters: 1% plastic, 99% know how.

The Moving Bed Bio-film Reactor (ECO MBBR™) technology is a leading-edge biological solution for wastewater treatment, based on a core understanding of microbiology and treatment processes and intensive Research & Development by IWW ECOCHEM with over 12 years of experience.

This simple and robust biological treatment process is suitable for specific wastewater treatment processes – nitrogen reduction, high BOD/COD removal, including difficult industrial wastewater requirements.

At the core of the technology, specially designed polyethylene bio-film carriers provide a large surface area for micro-organisms to grow on and perform specific biological treatment functions. Carriers are kept in suspension in the reactor either by the aeration system (aerobic zone) or mixers (anoxic zone). Bacteria from the wastewater attach themselves to the floating carriers.

The very compact configuration helps to achieve a highly active biomass concentration in the reactor and a low settling load in the downstream solids separation process. Bio-film wastewater treatment technologies are very robust, especially when compared to conventional technologies like activated sludge.

Key Characteristics

- > High tolerance to load variations (including suspended solids) and toxic shocks
- > Low solids load on clarifier
- > Very compact configuration, able to fit in very small spaces
- > High removal efficiencies for nitrogen, BOD and COD
- > Stable process and easy to operate
- > Easy reuse of existing structures
- > Ideal for upgrades
- > Fast start-up and fast recovery after shut-down
- > No sludge bulking problems
- > Low maintenance
- > More than 500 installations in 50 countries
- > 20 years of experience

Customers

> Municipal customers and water authorities

- Sewerage treatment plants with footprint restrictions (sewer mining), requirements for low discharge nitrogen, sludge settleability or bulking problems
- Recycled water schemes - nitrate reduction and treatment of brine concentrates

> Industrial customers:

- Food & Beverage, including Dairy and Wineries
- Mining and minerals, Pulp & Paper processing and industrial processes with difficult wastewaters
- Oil & Gas for wastewater with organics and nitrogen

- ECO MBBR standalone process, or, as a complete integrated process, can be designed to suit specific customer's requirements – engineered to suit specific needs, including footprint restriction, use of Existing infrastructure, feed fluctuations.

ECO MBBR™ Bench Scale Tests & Pilot

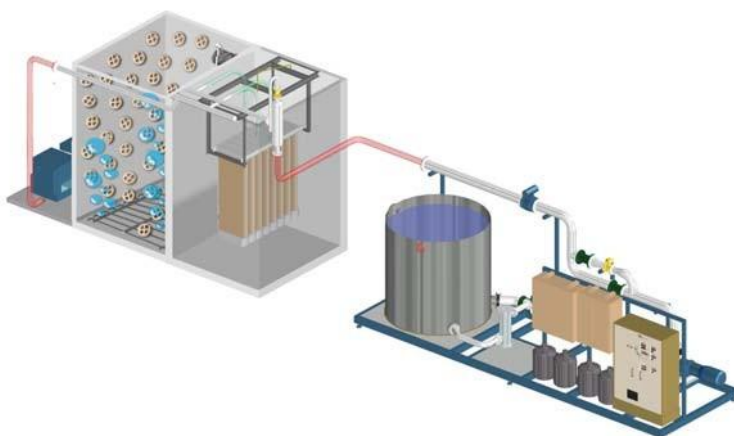
- In order to design the most suitable process for your plant, we can organise bench scale tests – batch or continuous bioreactor operation, under controlled conditions to simulate the full scale process. This will allow us to develop the optimum design, establish the key process parameters and prove the process performance.
- We can also test your wastewater for specific treatment results.

MBBR™ Process Combinations

ECO MBBR™ technologies can be used in combination with several sludge separation technologies, e.g. Membrane Bioreactor, clarification, Disc filters, DAF (Dissolved Air Flotation) or conventional clarifier.

ECO MBBR™ & MBR Packaged Plant: a unique packaged plant combining leading edge biological and membrane processes for small scale municipal & reuse applications.

- > A combination of the biological process of ECO MBBR™ and Membrane Bioreactor (MBR) - an immersed membrane filtration for very high removal efficiency of bacteria, suspended solids and high BOD/COD removal
- > Available in flow rates from 100 kL/day, this high efficiency compact and robust design can tolerate variations and disturbances



High quality water for reuse (sewer mining)

- > *This process produces high quality reuse water (class A+), suitable for irrigation, non potable re-use projects and discharge into sensitive environments*
- > *Ideal when combined with Reverse Osmosis to remove TDS for cooling tower make-up water for increased efficiency and reduced chemical and potable water consumption*

Advanced Water Treatment Plant, AMIN, Maldives



- > Design & Supply contract for treating Reverse Osmosis Concentrate (ROC) at Maldives
- > Removal of ammonia in ROC by biological nitrification using ECO MBBR™ as post treatment for effluent polishing, to reduce ammonium to 0.9 mg/L
- > Capacity: 200 TPD
- > Application: environmental discharge to meet stringent EPA environmental requirements

ECO MBBR 400 TPD in OMAN, ZUBAIR GROUP



- > Design, Build & Support for a Recycled Water Plant, to treat 400 kL/day of sewage (sewer mining project) for a low rise sustainable development in Zubair
- > Process: ECO MBBR™,

ECO MBBR 350 KLD in INDIA – SOUTH PART



- > Indian beer and spirits division of MIDAS, decided to expand their plant with additional water requirements attracting significant overhead charges, which encouraged CUB to recycle their wastewater
- > Process: two-stage MBBR™ used for polishing BOD after anaerobic treatment, prior to DAF and Microfiltration/Reverse Osmosis
- > Capacity: 350 KLD
- > Application: the reuse water is used for Clean In Place, general washing

FOOD & BEVERAGE – OMAN OASIS – 20 m³/Hr



- > The customer wanted to treat the dairy wastewater, and meet new discharge permit conditions before discharging to the river
- > Process: two-stage MBBR™ plant, treating 20 m³ per hour of wastewater, influent COD 3,500 mg/L, reduced to COD below 100 mg/L
- > The treated effluent exceeded objectives with BOD below 100 mg/L, typically effluent BOD < 50 mg/L

DCW Ltd – INDIA – 5 MLD



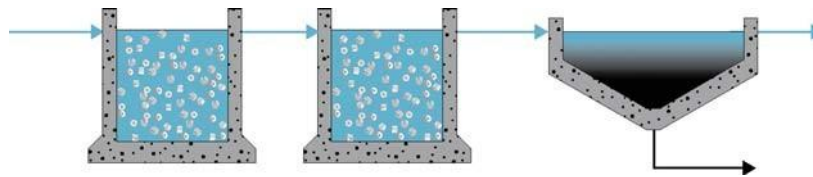
- > The Chemical Factory wanted to upgrade their existing primary wastewater treatment plant to secondary, using the process (combination of ECO MBBR™ and Activated Sludge)
- > The new secondary process uses ECO MBBR™ for pre-treatment, 2,000 m³ volume, and is followed by activated sludge
- > Efficient and high performance combination process in a unique configuration
- > The plant is currently achieving > 90% BOD removal

ECOMBBR™ Flexible Solutions

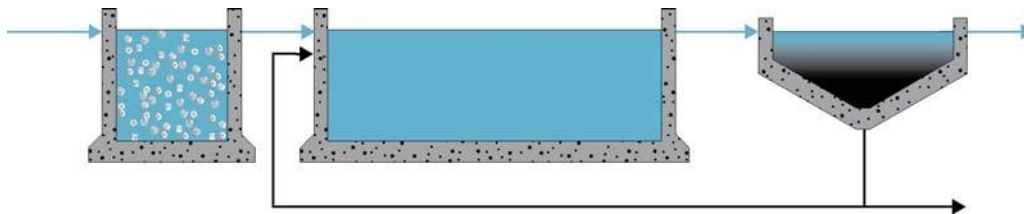
The ECO MBBR™ can be used in combination with other processes to achieve the appropriate treatment objectives: after anaerobic treatment for polishing BOD load; before activated sludge for high BOD/COD treatment, or multiple stages of ECO MBBR™. ECO MBBR™ is also ideal for upgrades or as post treatment to existing activated sludge for nitrogen removal.

- > The ECOMBBR™ process is suitable for: organic removal, nitrification, denitrification or detoxification.
ECO MBBR™ processes are suitable either for new plants, upgrade or expansion of existing plants.
- > Specially designed carriers will meet different applications. The carriers are designed to give a large surface area for micro-organisms to grow on.
- > The reactor can be filled with up to 70% volume of carriers, which are kept in the tank by sieves at the reactor outlet.
- > Several reactors in series may be used to develop specialised bacteria in each stage.

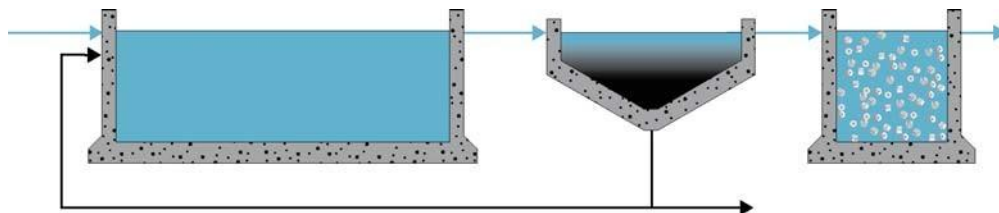
Two-stage ECO MBBR™ - Specialised, high performance treatment



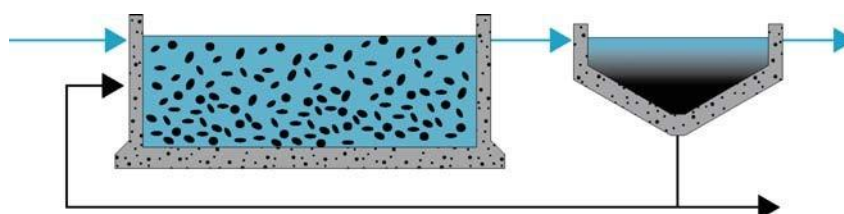
ASP™ ECO MBBR™ pre-treatment followed by Activated Sludge - High BOD/COD load



ECO MBBR™ post-treatment (polishing), e.g. for Post-Denitrification



ECO MBBR™ in activated sludge - ideal for upgrades, e.g. for nitrogen removal





IWW ECOCHEM

PURIFYING WATER SUSTAINING LIFE

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